

Wastewater Pump Station Odor Control :-

HD Q-PAC® was used in a small trickling biofilter as the odor removal system at a pump house. The pump house is situated in the middle of a residential area, which is only 20 feet away. The treatment plant had gotten odor complaints from residents every summer. A biotrickling filter was installed, which effectively reduced high levels of H₂S during the warm summer months.

Two 55-gallon liquid storage drums with inside diameter of 20 inches were welded together and used as the biofilter vessel. High-density polypropylene media was installed in the tower with the needles oriented vertically. Gaps between the media and the walls of the drums were filled with separated pieces of the high-density polypropylene media.

A centrifugal blower at 80-100cfm pushes the air into the biofilter. Contaminated air enters the bottom of the vessel, passes upward through the biofilm-coated media, and exits through the top. H₂S inlet concentrations in the pump house air range from 1 to 90ppm. Water is recirculated at six gpm. Fresh water with nutrients is added at 1 gpm for 15 min every day and H₂S concentrations are measured.

It was found that the H₂S removal efficiency increased gradually as biofilm developed on the media, but it remained below 45%. A commercial lawn fertilizer dispenser was connected to add ammonium phosphate and urea as micronutrients. After that, the H₂S removal efficiency rose to over 90% within a few days.

Central Wastewater Treatment Plant :-

Trickling biofilter is also used to remove hydrogen sulfide from exhaust air at the Hyperion Treatment Plant in Los Angeles, California.

This filter has an inside diameter of 4.5 ft and is packed with 7 ft of media, high-density polypropylene media was installed in the tower with its needles oriented horizontally. Each rectangular module of media was stacked tightly against the others, leaving no gaps between them. Gaps between the media and the walls of the circular tower were filled in with small pieces of porous rock.

A blower sends untreated air into the bottom of the trickling biofilter. The air flows upward through the biofilm-coated media, while the water trickles down over it. The treated air exits the top of the unit.

The filter was initially used to treat 700 cfm of air containing 2-20ppm of H₂S. Water was recirculated over the media at a rate of 10 gpm. The pH of the water decreased to less than 2.0. After that, a portion of the acidic solution was made to overflow every 4 hours by adding secondary effluent at 3 gpm for 20 minutes. In addition to controlling the pH, the 360 gallons of make-up water added each day provided micronutrients needed for growth of the biofilm. The H₂S concentrations in the inlet and outlet air streams were measured daily.

The removal efficiency of H₂S increased steadily for the first few days of operation, reaching 90% within 10 days. Ever since then, the removal efficiency has remained between 90% and 95%, with higher efficiencies recorded occasionally. Since the initial start-up period, the H₂S removal efficiency has never fallen below 90%. In this way biofilters can be used effectively for removing H₂S there by reducing the odor in various cases.

In order to overcome the drawbacks of conventional media, many industries developed different types of designs. For example let us discuss about a high-density polypropylene known as HD Q-PAC.

Physical properties of HD Q-PAC are as follows:-

- Material -- Polypropylene
- Specific Surface Area -- 132 ft² /ft³
- Dip Points -- 75,000/ft³
- Bulk Density -- 7.5 lb/ft³
- Void Fraction -- 87.8 %
- Smallest Grid Opening -- 0.16" x 0.16"
- Standard Module Size -- 12" x 12" x 12"

This media is acid-resistant, lightweight, easy to handle, and rigid enough to walk on. It can be stacked to any desired depth. It provides 132 ft² of plastic surface per cubic foot, yet it has a high void fraction, so that even when coated with a layer of biofilm it still presents much less resistance to air flow than oomph or rock media.

This makes it possible to treat air at higher superficial velocities with reasonable fan power requirements, so trickling bio filters can be made taller rather than wider, saving valuable space in crowded treatment facilities.

Now let us discuss how these high density polypropylene media can be used in industries for odor control in different cases.

